REMARKS

Amendments to the Claims

Claims 1, 4, 8, 11 and 19 are amended. Claims 3 and 7 are cancelled. Upon entry of the amendment, claims 1, 2, 4-6 and 8-21 are presented for consideration by the Examiner.

Claim Objections

Claim 19 is amended to correct any informalities properly raised by the Examiner.

Claim Rejections 35 U.S.C. § 102

Claims 1, 2, 6, 9-13, 15, 17, 18, 20 and 21 were rejected under 35 U.S.C. § 102(b) as being anticipated by German unexamined Patent Application No. DE 2 243 564, Applicant Kerb-Konus-Vertriebs (hereafter KKV).

Claims 1, 2, 4-6, 8, 9, 22 and 23

Claim 1 recites, in pertinent part:

> wherein said pin is formed from cylindrical stock having a first diameter and said retaining surface has a second diameter larger than said first diameter, a majority of each said land having a substantially uniform height extending above said first diameter and the width, the width of at least one land is at least approximately five times said height.

KKV discloses a pin shaped connecting element produced by conducting a rolling operation on bar stock. (Page 4, lines 2-11) KKV does not disclose, teach or suggest any particular relationship between the height and the width of the lands. Significantly, KKV does not disclose, teach or suggest that the lands surfaces are raised with respect to the bar stock diameter.

It is important to note that the language of claim 1 specifies a relationship between the height of the land surfaces above the pin stock diameter and the width of

the lands. KKV discloses a pin shaped connecting element illustrated in Figures 1 and 2 having only a single diameter. KKV does not discuss how the diameter of the bar stock is altered by the rolling process or any particular relationship between the bar stock diameter and the diameter of the resulting land surfaces.

As discussed in great detail in applicant's specification, the low profile land surfaces recited in claim 1 have the strength to resist being shaved off or removed during insertion in a hole in a hardened host material. KKV does not disclose, teach or suggest the limitations of claim 1 which provide the unexpected and beneficial results documented in the Applicant's specification.

Claim 1 is patentable over KKV for at least the foregoing reasons.

Claims 2, 4-6, 8, 9, 22 and 23 depend directly or indirectly from claim 1 and are patentable for at least the reasons stated in support of claim 1.

Claim 2 recites in pertinent part "wherein said lands are oriented at an angle of approximately 45° relative to said longitudinal axis." The Examiner indicates that KKV discloses a pin wherein the lands are oriented at an angle at "near the value of" 45° relative to the longitudinal axis. Applicant directs the Examiner's attention to the enclosed enlarged and annotated Figures 1 and 2 from KKV. The lands and grooves of KKV are in fact oriented at an angle of 23° relative to the longitudinal axis of the pin. The dashed line showing an orientation of 45° clearly shows that the claimed orientation is more than twice that illustrated in KKV. Further, KKV teaches on page 4 "rolling in the spiral groove is extremely economical, since the spiral groove results in a very large pitch angle, and a correspondingly large machine feed forward can be used." The "pitch angle" referred to by KKV is an angle between a plane perpendicular to the longitudinal axis of the pin (such as A-A) and the helix formed by the grooves and lands. This angle is approximately 67°, e.g., "very large." KKV does not disclose, teach or suggest the desirability of reducing the illustrated 67° pitch angle to the claimed angle of 45°. It is likely that such a change to the KKV design would render the

described rolling operation decidedly less efficient by necessitating a corresponding reduction in the machine feed forward.

Page 6 of Applicant's specification contrasts the 30° angle of a helical crest and groove pattern in a typical knurl pin with the claimed 45° angle. The 45° angle has the advantage placing each land surface at a more horizontal orientation such that the land surfaces traverse a greater portion of the circumference of the pin for each unit of pin length. This configuration enhances the insertion and holding properties of the inventive pin as discussed in particular on pages 7-9 with reference to the test results shown in table 1. In addition, the claimed configuration diminishes the tendency of the lands to cut into the host material. Applicant's specification documents the unexpected improvements in the consistency of insertion and holding power of pins having the claimed structure.

KKV does not disclose, teach or suggest claimed land orientation of approximately 45°. Those of skill in the art in possession of Applicant's specification would understand that the 23° angle shown in KKV does not disclose, teach or suggest the claimed 45° angle. The disclosed 23° angle would not be considered "near the value of" the claimed 45° angle. Claim 2 is patentable for at least this additional reason.

Claim 3 recites, in pertinent part "wherein said second diameter is no greater than approximately 9% larger than said first diameter." Claim 4 recites a particular relationship between the diameter of the stock material "said first diameter" and the diameter of the land surfaces "said second diameter". KKV does not disclose the stock diameter or any particular relationship between the stock diameter and the diameter of the land surfaces. KKV does not disclose, teach or suggest the recitations of claim 4. Claim 4 is patentable for at least this additional reason.

Claim 5 is patentable for the reasons stated in support of claim 2.

Claim 8 recites, in pertinent part "wherein the majority of each of said lands has a substantially uniform height extending above said first diameter and the width of said

land is between 5 and 15 times said height." Claim 8 recites a particular structural relationship between the height of the lands above the pin stock diameter "said first diameter" and the width of the lands. KKV does not disclose, teach or suggest the structural relationships recited in claim 8. Claim 8 is patentable over KKV for at least this additional reason.

New claims 22 and 23 recite as follows:

> 22. The pin of claim 1, comprising a cylindrical pilot portion intermediate said formed portion and an end of said pin, said pilot portion having a diameter substantially equal to said first diameter.
>
> 23. The pin of claim 1, said pin having opposed ends and comprising a cylindrical pilot portion intermediate the formed portion and each of said ends, said pilot portions having diameters substantially equal to said first diameter.

Claims 22 and 23 require a pilot portion or portions having structural limitations not disclosed, taught or suggested by KKV. Claims 22 and 23 are patentable over KKV for at least this additional reason.

Claims 10-20

Claim 10 recites as follows:

> A pin and substrate combination comprising:
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> a substrate having a first hardness and defining a hole having a first diameter; and
>
> a pin for insertion into said hole, said pin having a second hardness less than said first hardness and a retaining surface at a second diameter larger than said first diameter, said retaining surface defined by a plurality of lands having a width separated by a plurality of grooves of approximately equal width,
>
> wherein at least a portion of each land includes a cylindrical surface parallel to said longitudinal axis at a substantially uniform radial distance from said longitudinal axis.

Claim 10 requires the pin to have "a second hardness less than said first hardness." While KKV is not specific as to the relative hardnesses of the pin and the host material, KKV emphasizes that "the edges between the groove and the surface is

of particular importance" because "they must be rounded, so that these edges do not produce any furrows in the whole wall." (page 4, lines 9-11) This strongly indicates that the pin material is harder than the host material because KKV is concerned that sharp edges on the pin will groove the host material. This is also a consequence of the large pitch angle of the spiral grooves disclosed in KKV. Thus, KKV does not disclose, teach or suggest the relationship between the hardness of the host material and the hardness of the pin recited in claim 10. Claim 10 is patentable for at least this reason over KKV.

Claims 11-20 depend directly or indirectly from claim 10 and are patentable for at least the reasons stated in support of claim 10.

Claim 11 recites "wherein said second diameter is .02mm to .1mm, larger than said first diameter." This structural relationship is supported in Tables 2 and 3 of Applicant's specification. KKV does not disclose, teach or suggest any relationship between the diameter of the land surfaces and the diameter of the hole in the host material. Claim 11 is not anticipated or obvious in view of KKV for at least this additional reason.

Claim 13 recites "wherein said lands and said grooves are helical and have an angle of approximately 45° relative to an axis of said pin." As discussed above with respect to claim 2, KKV does not disclose, teach or suggest lands at an angle of 45° relative to an axis of the pin. The KKV disclosure strongly suggests that such a change would significantly alter the disclosed rolling process in an undesirable way. KKV does not disclose, teach or suggest the recitations of claim 13. Claim 13 is patentable for at least this additional reason.

Claim 14 recites, in pertinent part: "wherein said first and second hardnesses are measured on the Rockwell Rc scale and said first hardness is approximately 10 points higher on the Rockwell Rc scale than said second hardness." KKV does not disclose, teach or suggest the relative hardnesses of the pin and host material. As discussed above with respect to claim 10, KKV indicates that the pin material is harder than the

host material. KKV does not disclose, teach or suggest the recitations of claim 14. Claim 14 is patentable for at least this additional reason.

Claims 15 and 16 recite a particular relationship between the diameter of a cylindrical stock and the diameter of the land surfaces. Claim 16 recites in part "wherein said second diameter [the land surfaces] is less than approximately 9% larger than said third diameter [the diameter of cylindrical stock]." As discussed above with respect to claim 4, KKV does not disclose, teach or suggest any relationship between the stock diameter and the raised surfaces of the lands. In fact, KKV teaches nothing about the diameter of the stock material or any diameter changes resulting from the rolling process. KKV does not disclose, teach or suggest the limitations of claims 15 and 16. Claims 15 and 16 are patentable for at least this additional reason.

Claims 18 and 19 recite particular relationships between the height of the land above the diameter of the pin stock material and the width of the land. KKV does not disclose, teach or suggest the structures and relationships recited in claims 18 and 19 as discussed above with respect to claims 1 and 8. Claims 18 and 19 are patentable over KKV for at least this additional reason.

Claim 21

Claim 21 recites in pertinent part "

> 21. A pin for insertion in a hole in a host material and frictional retention therein, comprising:
>
> an elongated cylindrical body having a longitudinal axis, a cylindrical pilot portion, and a retainer portion defined by a plurality of alternating helical lands and grooves, wherein said lands provide a retaining surface for engaging an inside surface of the hole;
>
> said retaining surface being a radial distance from the axis that is greater than a radius of the pilot portion and occupying at least approximately 40% of the circumference of the retainer portion when the retainer portion is viewed in cross section perpendicular to said axis.

Claim 21 requires a "cylindrical pilot portion and a retainer portion defined by a plurality of alternating helical lands and grooves" and "said retaining surface being a radial distance from the axis that is greater than a radius of the pilot portion." KKV does not disclose, teach or suggest a pin having a pilot portion and a retaining surface

having structures and relationships recited in claim 21. Claim 21 is patentable over KKV for at least these reasons.

Inherency

Throughout the rejections of the claims, the Examiner makes repeated reference to the word "inherent" where specific structural limitations and relationships are not explicitly shown in KKV. Applicant has discussed the various structural differences between Applicant's claim and the disclosures of KKV. Specifically, the Examiner asserts that the structures of the lands recited in amended claim 1, claim 8, claims 18 and 19 are "inherent" in the pin disclosed in KKV. The Examiner makes no argument and cites to no support for this use of inherency. The structural limitations of claims 1, 8, 18 and 19 do not relate to the physical properties of the materials and are not an automatic result of any particular process. The claimed structures and relationships are produced intentionally and have proven to produce desirable and unexpected results.

Applicant directs the Examiner's attention to MPEP § 2163.07(a) entitled Inherent Function, Theory or Advantage. "To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." In re Robertson, 169 F.3rd 743 (Fed. Cir. 1999). The relationships cited in Applicant's claims 1, 8, 18 and 19 are not disclosed, taught or suggested in KKV, nor can inherency be used to support an argument that the recited structures and relationships are present in the pin shaped connecting element disclosed in KKV.

Applicant respectfully requests that the Examiner support his inherency arguments with citation to specific teaching in KKV of the recited structures and relationships or withdraw the inherency rejection of the claims.

For all the foregoing reasons, Applicant respectfully requests allowance of claims 1, 2, 4-6 and 8-23.

Respectfully submitted,

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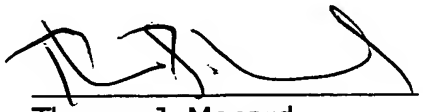

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